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ADP013444

**TITLE:** The Cooperation Between Poison Control Center and Organized Industrial District for Chemical Disaster Prevention

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**TITLE:** Chemical and Biological Medical Treatment Symposium - Industry II World Congress on Chemical and Biological Terrorism

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ADP013371 thru ADP013468

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## **75. THE COOPERATION BETWEEN POISON CONTROL CENTER AND ORGANIZED INDUSTRIAL DISTRICT FOR CHEMICAL DISASTER PREVENTION**

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### **ABSTRACT**

Industrial Districts have many plants that use or produce toxic substances. Thousands of healthy technicians and employers work at important and powerful equipment. The plants in these districts may cause many dangerous fires, explosions, a spillage of disposal in an accident or during earthquake in peacetime. Industrial Districts are also targets of the terrorist attacks in peacetime or soldiers during a war. Another danger may emerge when these districts are built near overcrowded urban regions of the cities.

Our project involves the Bursa Organized Industrial District's chemical disaster prevention efforts.

A hotline line between center and district was established, while Toxes Plus and Intox Programmes adding Micromedex Computer Programme were provided by the district administration. A-17 question survey was distributed to 76 plants. Among them, 66 plants with a total of 10342 workers responded to the survey. This survey revealed 47 different chemical agents. As a result 'safety diskettes' were prepared in DOS and Windows 95 formats. Each diskette contains information about the properties and the toxicity of the chemicals that are used in that plant. Preventive measures and a first aid sections were also included in each diskette. Fire Department was warned about the kind of properties of chemicals that may be subject to combustion, ignition or explosion. The medical group of district was trained about exposure of toxicity, acute and chronic toxicity, and related first aid measures.

### **INTRODUCTION**

Bursa was the first capital of Ottoman Empire and located on the South East of Marmara Sea and founded on the foot of Uludag, the third highest mountain in Turkey. Location of the city has been since 2500 B.C. and it has had important role on the traditional 'Silk Road' from China to Italy.

Bursa was described as 'Green Bursa' or as 'A city for retired people'. But in the last thirty years, it was rapidly transformed to an 'Industrial City'.

Organized Industrial District of Bursa had been established officially in 1966. Enlarged area of the District now has been reached 3.7 million square of meters. The number of firms were 163, number of employees were 25500 in the year of 1997.

The oldest industrial sector of Bursa is the textile sector and it has played a very important role in the beginning of industrial growth. More recently developed motor-car sector, and sub suppliers of it are also the other important sector of industry (1).

### **METHOD**

A questionnaire was prepared for computer diskettes to be used in the prevention and treatment of the toxicity of chemicals commonly used or produced in the plants located in the Organized Industrial District in Bursa, Turkey. It consists 17 questions about firm, doctor,

people and chemicals. And these surveys were distributed to 76 plants by the management of the Industrial District. Table:1

Completed questionnaires were returned from 66 (86.8 %) plants.

The total numbers of employee in these plants was found to be 10342.

Questionnaires revealed 47 different chemical agents.

Two Safety discettes for each plant were prepared with reference to Micromedex Tomes, Tomes Plus and Intox programmes and in DOS and Windows 95 formats. One of them was given to the Manager or Doctor of the plant. Pack of diskettes about 66 plants was delivered to the Management of Industrial District.

Each diskette contains information about the physical properties, physical and chemical dangers (fire, ignition, explosion and pollution effect), type of exposure (inhalation, skin, eyes and ingestion) , results of short-term and long-term exposure, clinical findings of disease , storage, disposal methods of the chemicals used in that plant. Preventive measures against contamination and intoxication, first aid sections were also included in each diskette.

## RESULTS

We classified the hazardous properties of these 47 chemical substances as 23 combustible, 12 ignitive, 24 explosive and 40 pollutant (Graphic 3)

Exposure of toxicity was through inhalation route (n: 42), dermal route (n: 26), mucosal and eye (n: 36) and gastrointestinal route (n: 30) (Graphic 4).

Respiratory system (n: 42), central nervous system (n: 15), skin (n: 33), eye (n: 36) and metabolic organs (n: 15) were predisposed to acute toxicity (Graphic 5).

Chronic toxicity was found to affect respiratory system (n: 16), skin (n: 16), genitourinary system (n: 4) and liver (n: 10). 4 of 47 toxic chemical substances had genotoxic and 4 others were cancerogenetic effects (Graphic 6)

The data of the plants and chemicals were shown, Fig: 1, 2, 3, 4, 5, 6.

## DISCUSSION

Eco-Terrorism was first described Bokan S and co-workers in 1977. Authors pointed out to the dangers of Industrial districts in below: The plants which use or produce the toxic substances have many dangerous hazard as fire, explosion, an accident as a spillage of disposal in the peacetime. Industrial Districts are also the targets of the terrorist attack. Although a country may not posses chemical weapons (CW) , the forces destroy the chemical plants, petrochemical plants, oil and gas well, pharmaceutical plants, biotech industries and other facilities by using the conventional weapons during the war. This special method of conducting chemical war - not by attacking with CW, but by attacking an industry which uses tens and hundreds of thousands tons of hazardous chemicals could kill and/or poison tens of thousands of persons ,could contaminate the waters, ruin forests and agriculture (ECO - TERRORISM) (2).

As seen in figures, plants have many ignitive, explosive, pollutant substances that will set on fire, burst and pollution in surrounding areas. Serious diseases will occur early and later depending on the kind of substance and exposure period, after disaster. An another important point is that the workers, manager and even doctors in that plants or the people living near the districts are not aware of these dangers.

Poison Information Centers can be helpful by teaching for medical and fire person before accident or by hotline during emergency situation.

## **CONCLUSION**

A hot line and preparation of Chemical Safety Diskettes will be useful adjunct in acute or chronic Toxicological Emergencies and Disaster Planning of the Industrial District, both of Peace and War purposes.

## **KEY WORDS**

Industrial District, Chemical Disaster, Prevention

## **REFERENCES**

1. Industrial Directory of in Bursa 1996 , Barışçı Ajans -Rota Ofset, p.20
2. Bokan S, Orehovec Z, Jukic I, Taborsky V, Eco - Terrorism, Chemical War by Conventional Weapons, ASA 97 - 6, p.7

## **Table 1: BURSA INDUSTRIAL DISTRICT CHEMICAL SAFETY PROJECT QUESTIONNAIRE**

Firm Name:

Address:

Owner:

Doctor of Medicine:

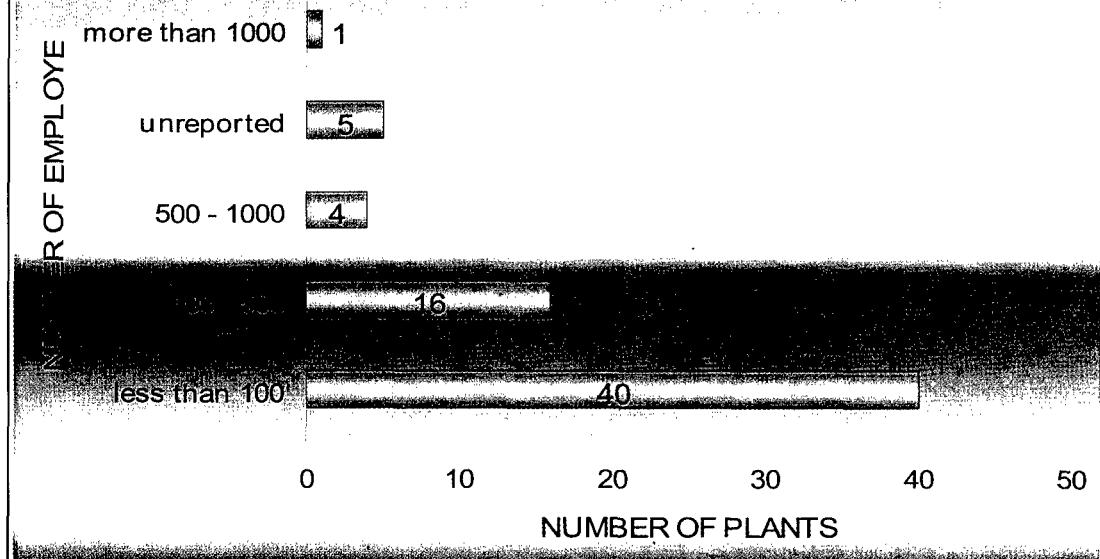
Number of people working:

Number of people working in the chemical hazard area:

Work hours: Work time:

- Has there been any accident , intoxication or occupational health problems in the firm until now ?
- Chemicals used.
- Generic names of the chemicals.
- Physical properties of the chemicals ( solid, liquid, gas, powder).
- Annual amount of chemical used.
- Measure taken the prevent intoxication or contamination.
- Material and methods used to prevent intoxication and contamination.
- Disposal methods of the chemicals(incinerate, wash out, sewage, smoke ).
- Which program do you prefer for at the diskette.

### FIG.1 FACTORY POPULATION I



### FIG.2 FACTORY POPULATION II

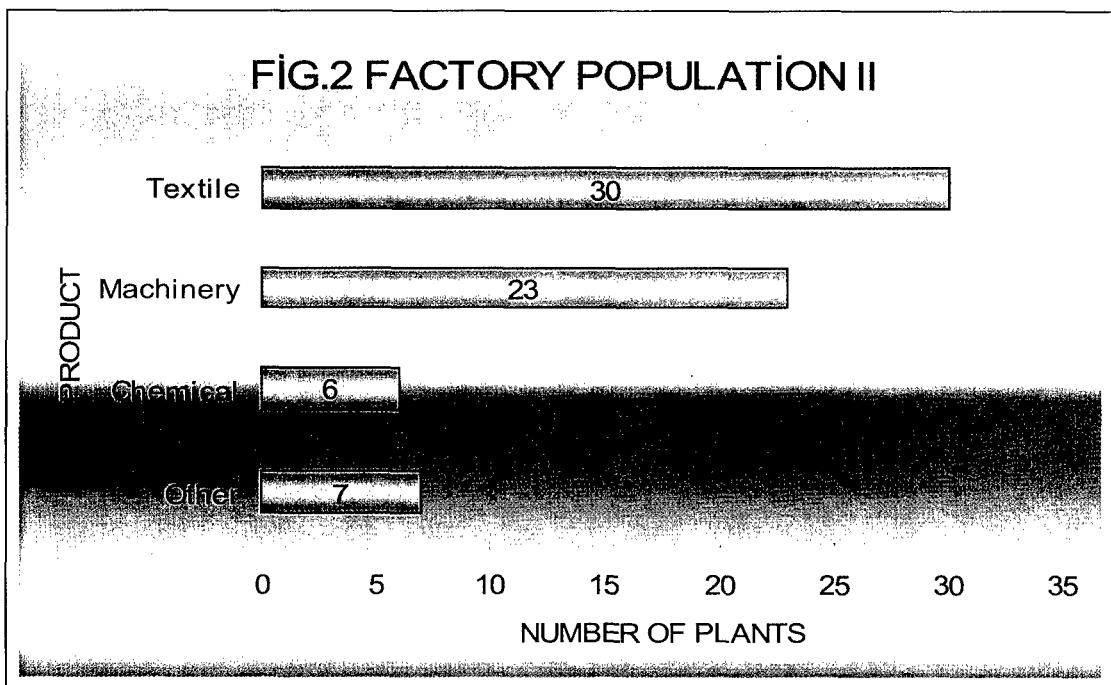


Fig.3 Hazardous Properties

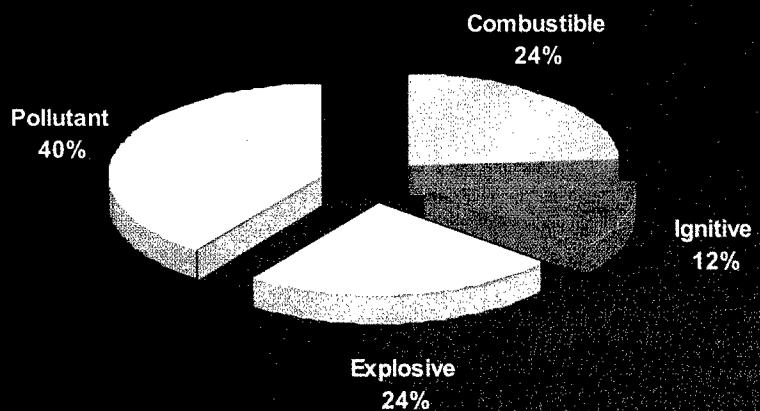
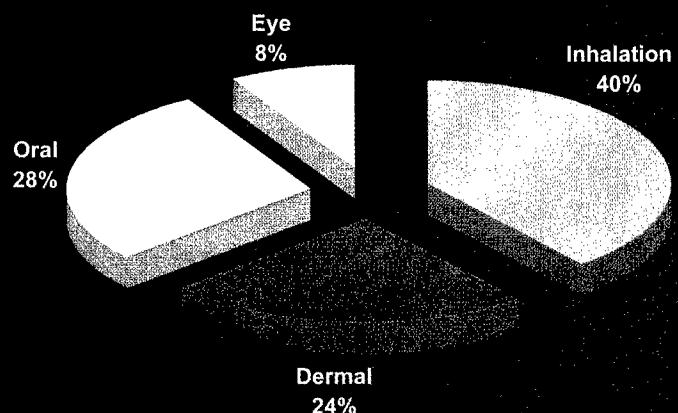
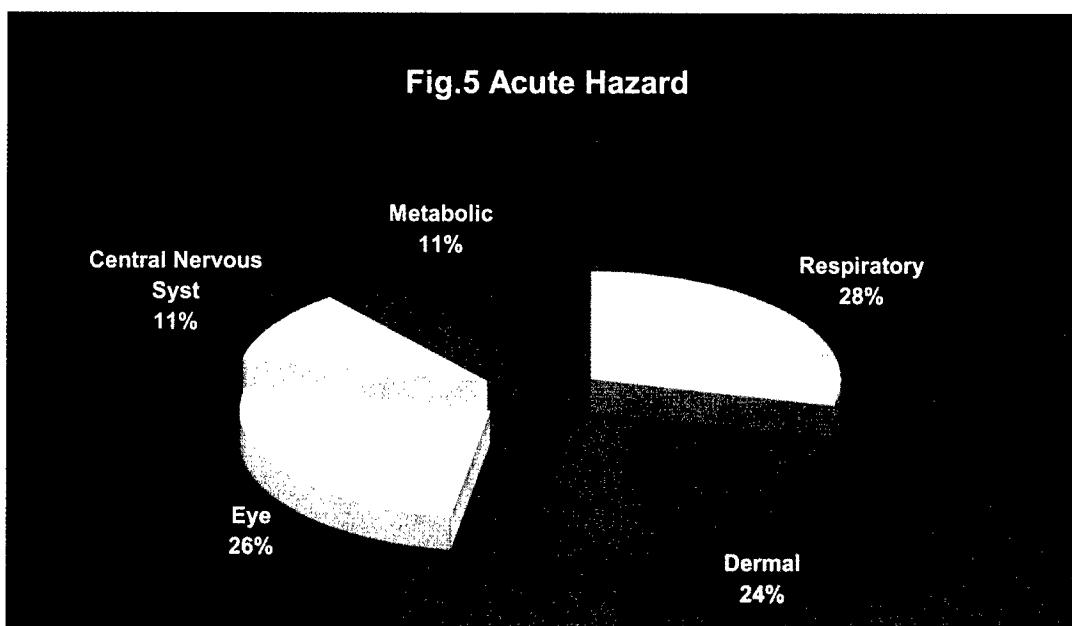


Fig.4 Route of Toxicant



**Fig.5 Acute Hazard**



**Fig.6 Chronic Toxicity**

